PHYSICS

BOOKS - BAL BHARTI

WORK AND ENERGY

Solved Examples

1. Calculate the work done to take an object of mass 20 kg to a height of 10 m.

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2. Pravin has applied a force of 100 N on an object, at an angle of 60° to the horizontal. The object gets displaced in the horizontal direction and 400 J work is done. What is the displacement of the object?

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3. A stone having a mass of 250 gm is falling from a height. How much kinetic energy does

it have at the moment when its velocity is 2 m/s?

4. 500 kg water isstored in the overhead tank of a 10 m high building.Calculate the amount of potential energy stored in the water.

5. Swaralee takes 40 s to carry & bag weighing 20 kg to a height of 5 m. How much power has she used?

6. A 25 W electric bulb is used for 10 hours every day. How much electricity doesit consume each day?

1. You have learnt how to calculate the work done on an object when the displacement is in the direction of the applied force. But if the displacement is not in the direction of the applied force, how do we calculate the amount of work done

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2. Use your Brain Power!

If the mass of a moving body is doubled, how many times will be kinetic energy increase?

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Exercises

1. Explain the difference between potentail energy and kinetic energy.

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2. Answer the following questions:

Derive the formula for the kinetic energy of an object of mass m moving with velocity v.

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3. Prove that the kinetic energy of a freely falling object on reaching the ground is nothing but the transformation of its initial potential energy

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4. Answer the following questions:

Determine the amount of work done when an object is displaced at an angle of $30°$ with respect to the direction of the applied force.

5. Answer the following questions:

If an object has 0 momentum, does it have kinetic energy? Explain your answer.

6. Why is the work done on an object moving

with uniform circular motion zero?

7. Choose one or more alternatives:

For work to be performed, energy must be ......

A. transferred from one place to another

B. concentrated

C. transformed from one type to another

D. destroyed

8. Choose one or more alternatives:

the joule is the unit of........

A. force

B. work

C. power

D. energy

9. Choose one or more alternatives:

Which of the forces involved in dragging a heavy object on a smooth, horizontal surface, have the same magnitude?

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10. Choose one or more alternatives:

Power is a measure of the ....

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11. Choose one or more alternatives:

While dragging or lifting an objectm negative

work is done by.........

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12. The potential energy of your body isleast

when you are......

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13. The total energy of an object falling freely towards the ground...................

14. If we increase the velocity of a car moving on a flat surface to 4 times its original speed, its potential energy.....

15. The work done on an object does not depend on.....

16. Questions based on paragraph

Study the following activity and answer the questions.

Take two aluminium channels of different lengths.

Place the lower ends of the channels on the

floor and hold their upper ends at the same height.

Now take two balls of the same size and weight and release them from the top end of the channels. They will roll down and cover the same distance.

Which law related to energy does the above activity demonstrate? Explain.

17. Questions based on paragraph

Study the following activity and answer the questions.

Take two aluminium channels of different lengths.

Place the lower ends of the channels on the floor and hold their upper ends at the same height.

Now take two balls of the same size and weight and release them from the top end of the channels. They will roll down and cover the same distance.

Which law related to energy does the above activity demonstrate? Explain.

18. Study the following activity and answer the questions: Now take two balls of the same size and weight and release them from the top end of the channels. They will roll down and cover the same distance.

19. Study the following activity and answer the questions: At the moment of releasing the balls, which energy do the balls have?

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20. Study the following activity and answer the questions: As the balls roll down which energy is converted into which other form of energy?

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21. Study the following activity and answer the questions: Why do the balls cover the same distance on rolling down?

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22. Study the following activity and answer the questions: What is the form of the eventual total energy of the balls?

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23. Questions based on paragraph

Study the following activity and answer the questions.

Take two aluminium channels of different lengths.

Place the lower ends of the channels on the floor and hold their upper ends at the same height.

Now take two balls of the same size and weight and release them from the top end of the channels. They will roll down and cover the same distance.

Which law related to energy does the above activity demonstrate? Explain.

24. Solve the following examples:

An electric pump has 2 kW power. How much water will the pump lift every minute to a height of 10m?

25. Solve the following examples:

If a 1200 W electric iron is used daily for 30 minutes, how much total electricity is consumed in the month of April?

26. Solve the following examples:

If the energy of a ball falling from a height of 10 metres is reduced by 40%, how high will it rebound?

27. The velocity of a car increases from 54 km/hr to 72 km/hr. How much is the work done if the mass of the car is 1500 kg?

28. Solve the following examples:

Ravi applied a force of 10 N and moved a book 30 cm in the direction of the force. How much was the work done by Ravi?

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